

Devices and Methods for Collection and Concentration of Air and Surface Samples for Improved Detection, Phase I

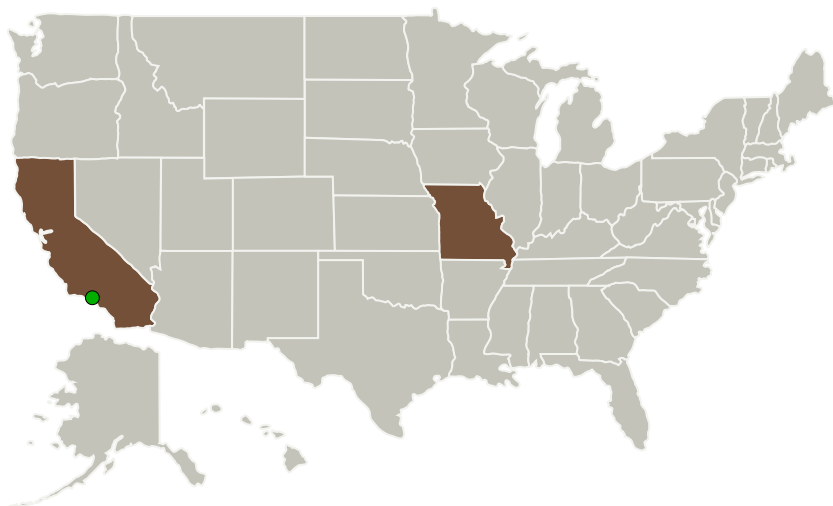
Completed Technology Project (2016 - 2016)



Project Introduction

Protecting the International Space Station (ISS) crew from microbial contaminants is of great importance. Bacterial and fungal contamination of air, surfaces and water aboard ISS has the potential to cause sickness among ISS crew and to impact onboard experiments. Further, it has been noted that pathogenicity and virulence of microbes can increase in microgravity environments. These factors, along with the high consequence of sickness in the remote space environment, creates a significant need for a rapid way to determine when microbial contamination events occur. To this end, InnovaPrep LLC of Drexel, MO proposes development of improved methods for collection of microbes from air and surfaces for delivery into a small liquid volume compatible with advanced molecular based detection systems. Rapid microbiological detection systems have taken dramatic steps forward in the last two decades and today detection of even a single organism is possible in less than one hour. Unfortunately, development of rapid detection methods has far outpaced development of sample collection and concentration techniques, which are necessary to enable detection of low microbial concentrations in the environment. In the proposed Phase I work, InnovaPrep will leverage current aerosol and surface collection and elution technologies and innovations from a 2015 NASA awarded SBIR for microbial concentration from ISS potable water, for handling of these technologies in a microgravity environment, to develop novel ISS aerosol and surface collection systems. Specifically, InnovaPrep will develop new, optimized aerosol filter assemblies and surface sampling assemblies that allow for collection from larger air volumes and surface areas and elution into smaller liquid volumes than is currently possible.

Primary U.S. Work Locations and Key Partners



Devices and Methods for Collection and Concentration of Air and Surface Samples for Improved Detection of Microbes onboard ISS, Phase I

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Organizations Performing Work	Role	Type	Location
InnovaPrep, LLC	Lead Organization	Industry	Drexel, Missouri
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Missouri

Project Transitions

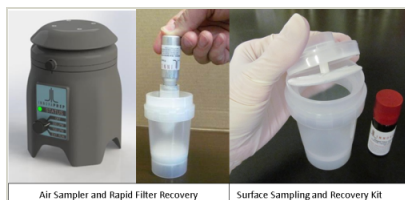
▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139826>)

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/134114>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

InnovaPrep, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

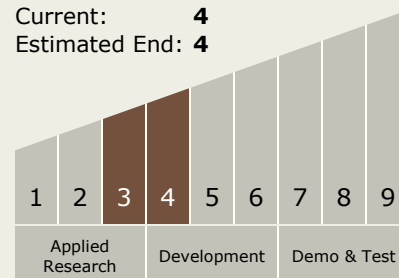
Carlos Torrez

Principal Investigator:

Andrew E Page

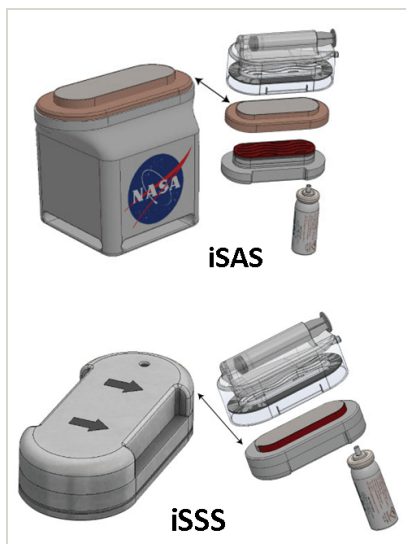
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Final Summary Chart Image

Devices and Methods for Collection and Concentration of Air and Surface Samples for Improved Detection of Microbes onboard ISS, Phase I Project Image
(<https://techport.nasa.gov/image/128744>)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.4 Environmental Monitoring, Safety, and Emergency Response
 - └ TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System